



Department of

Horticulture

WASHINGTON STATE UNIVERSITY

Department of Horticulture Seminar Series

HORT 510

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Presented at the following WSU campuses and Research and Extension Centers: Pullman, Tri-Cities, Mount Vernon, Prosser, Puyallup, Wenatchee

Branch to Bottle Assessment of Shake-and-Catch Mechanical Harvesting of Cider Apples as an Alternative to Hand Harvesting

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Abstract

A major obstacle to sustained growth of the burgeoning U.S. cider industry is an unstable reliance of cider apple growers on hand labor for the harvest of fruit. When labor is unavailable, profits are unrealized from unharvested fruit and their incurred production costs. Cider apples have been machine-harvested in the U.K. for decades utilizing a shake-and-sweep system that is incompatible with the high density, shallow rooted apple orchards of WA State. I carried out two studies in Mount Vernon, WA from 2014 to 2016 to assess the implementation of a shake-and-catch mechanical harvest system as a suitable alternative to hand harvest. I compared harvest methods in terms of (i) fruit yield and juice quality at harvest and after 2 and 4 weeks ambient storage (13.3 °C), and (ii) cider quality as evaluated by a trained panel and an electronic tongue. In the first study, yield of fruit picked by the machine harvester in proof of concept was 74% that achieved by hand harvesters with a potential 41% loss of yield if the 100% bruised fruit were ambient stored up to 4 weeks. Juice quality characteristics including titratable acidity and titratable tannin did not differ due to harvest method. In the second study, trained panelists and an electronic tongue perceived sensory differences between cider derived from machine- and hand-harvested fruit. Some key differences included a darker color, a more astringent mouthfeel, and a sourer taste of the machine-harvested samples. Together, these studies demonstrated that shake-and-catch mechanical harvesting of cider apples can be a viable alternative to hand harvesting provided fruit are pressed or cold stored immediately. Further, while traditional characteristics such as astringency were observed to be reduced in cider derived from machine-harvested fruit, cider makers can manage these reductions with modifications of pressing and/or juice processing protocols.